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"Configuration" of Data Models based on Subject Area Modules

an approach to AP Interoperability

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Current Situation and Problems

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- **Interoperability of applications based on different APs was not a design goal of STEP**
  - no methodology available focusing on AP interoperability
  - STEP base technologies not suited
- **Use of multiple APs in a computer-supported process chain not possible**
  - ... without adaptation of the APs used
  - loss of required information is expensive
- **This fact turns out to be a growing drawback of STEP**
- **Current efforts focus on the symptoms, but not on the problems behind the symptoms**

Origins of the Approach

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- **WG10 Workshop, NIST, Jan. 1997**
  - Recommendations - Presentation (G. Staub)
    - ».... migration from a “single AP-centred” STEP architecture and methodology to an “interoperability-centred”
      - interoperability should be one central requirement for and a design principle of the “new SC4 architecture”
    - »... move form “monolithic AP-approach” to a more modular approach with “well-defined interfaces”
      - “configuration” of APs rather than development from scratch
      - “less freedom for individualism - more focus on commonality”
    - »... future description and implementation forms to support “plug & play” interoperability
      - less effort for generating interoperable solutions

Solution Approach

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- **Reusability**
  - reusable modules of subject areas
  - different alternatives for each subject area might be needed by different application domains
  - mapping between different alternatives for a given subject area
- **Information hiding**
  - clearly defined interfaces
  - subject areas may depend on other subject areas
  - pre- and postconditions for each subject area
- **Template mechanism for EXPRESS, combined with enhanced interfacing capabilities**
  - configurations of an AP using the various subject areas
  - tracking the actual “configuration path” ensues the detection of information voids and semantic counterparts

Required Extensions

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- **ISO 10303-11 related**
  - extensible SELECT types
  - ENUMERATION types
  - template mechanism
  - improved schema interface capabilities
- **ISO 10303-21 related**
  - short form implementations
    - »multiple schema support in ISO 10303-21
      - => multiple data section
    - »cross references between data sections
  - only use of external mapping in ISO 10303-21
  - no AP specific subtypes but base types + constraints
- **Methods for creating the subject areas and for "configuration" of data models**

Status of Work

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- **Initial extensions made to EXPRESS**
  - extensible SELECT and ENUMERATION types
  - template mechanism on entity level
  - based on the ECCO Tool
- **User interface for the configuration process designed**
- **Subject areas defined**
  - mainly on the basis of the ongoing AP212/214 interoperability efforts
  - product identification, assemblies, properties, effectivity, organizational data, classifications, etc.
  - all of these subject areas are derived from more generic modules using the advance interface capabilities

Conclusions

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- **AP configuration approach based on models of different subject areas eases AP interoperability**
- **Alternatives for subjects areas offers (some of) the necessary freedom for AP teams**
- **Software vendors benefit from this approach. since they can reuse code for different APs**
- **End users benefit from this approach, since implementations are earlier available**
- **Extensions to the EXPRESS and to the implementation forms needed**
- **Mapping between data models still necessary**
  - ... but should be minimised were possible